Personality Factors' Influence on Walking in Programs with Financial Incentives

Andrew Noble

University of Minnesota

Abstract

Efforts to encourage people to engage in healthy and preventative health care in general are growing trends. This study was a pilot study to evaluate the methodology of a larger study examining the effects of paying people to walk, a low impact form of exercise. Participants were offered a financial incentive for walking a certain amount over the course of a week. Participants completed a set of self-report questionnaires to evaluate their locus of control, their Big Five personality traits, and their motivational style. Having an internal locus of control was specifically hypothesized to be correlated positively with greater walking performance. Correlations were computed to determine if any of the personality factors could be potential influences or predictors of walking performance in programs that offer financial incentives. While significant results were not obtained, extraversion and extrinsic motivation were two personality factors that were correlated with the amount participants walked. Locus of control was not correlated with the amount walked.

Personality Factors' Influence on Walking in Programs with Financial Incentives

As the rates of obesity, heart disease, diabetes, and other health threats continue to grow in America (Barness, Opitz, & Gilbert-Barness, 2007), there is increasing interest in healthcare and insurance programs for incentivizing individuals to engage in healthy behaviors. These incentives can come in the form of insurance rate deductions or cash rewards for engaging in regular exercise and healthy eating. Currently, a limited amount of research has been published on the effectiveness of such programs, and even less has been published on relevant factors and methods that influence or can improving program effectiveness.

Previous research has suggested that external motivations are more important than internal ones during the beginning stages of exercise adoption, e.g., appearance/weight concerns, but that for sustained exercise, intrinsic motivations are paramount, e.g., enjoyment, (Ingledew, Markland, & Medley, 1998). This suggests that monetary incentives, which are also external motivators, can be successful in encouraging healthy behaviors in at least the short term; though it is unknown if sustained monetary incentives would continue to be effective over longer time frames.

This study was a supplementary analysis of a pilot study for a larger study conducted in the fall of 2013 by Prof. Rothman and Rachel Burns of the University of Minnesota. The pilot study's main purpose was to evaluate the basic effectiveness of the experiment's methodology prior to its large-scale implementation. The pilot and full study examined the results of paying individuals to exercise in the form of walking, a low-stress physical activity. This paper focuses on the results of the pilot study to examine whether locus of control (Tong & Wang, 2006), the Big Five personality traits, extraversion, agreeableness, conscientiousness, neuroticism, and openness (John, Naumann, & Soto, 2008), and different situational types of motivation, external,

internal, identified, and amotivation (Guay, Vallerand, & Blanchard, 2000), were associated with the participants performance. Due to the limited sample size of the pilot study, obtaining statistically significant results was not feasible. However, if general trends can be identified, they can assist in formulating new hypotheses and directing future research. For example, a greater understanding of the role locus of control has on the initiation, and maintenance of exercise could be utilized to boost the effectiveness of exercise programs and other financial incentive based health programs.

A factor that may impact how successfully participants respond to external incentives for engaging in healthy behaviors is an individual's locus of control, which is the degree to which a person believes he or she can control what happens to them in life. A person can attribute the control of events to internal or external forces, and can regard each of these loci as being either stable or unstable. For example, if an individual skips a planned exercise routine, he or she could attribute the cause of this event to an unstable internal factor ("I was too tired to exercise, but I'll have more energy tomorrow."), or a stable external factor ("I'll never have time to exercise because of work.").

Research has indicated that what factors we attribute causes to are important in shaping an individual's emotional response to success and failure (McFarland, & Ross, 1982), and locus of control can have a strong influence on where individuals place causation. Locus of control has also been demonstrated to be malleable through different forms of reattribution therapy (Sinha, Gupta, & Sandhya, 2006). If locus of control is demonstrated to be an important factor in initiating and/or maintaining exercise behaviors in this project, it may be possible to use reattribution therapy to improve health incentivizing programs and lower dropout rates in

exercise programs in general, which could have widespread benefits if utilized on a large scale by health insurance and other companies.

Previous research has linked a stable internal locus of control with greater success in exercise involvement, compared to an unstable external locus of control, even among participants who withdrew from the formal program (Shields, Brawley, & Lindover, 2005). This study provides us with evidence of the importance of locus of control for sustained independent exercise engagement over time, but the effects that extrinsic financial motivators and locus of control will have together on exercise practices is not currently known.

Method

Participants

Twelve participants were enrolled in the pilot study. Participants were University of Minnesota students who received REP points for their participation in the study. Demographic information was not recorded for the participants.

Materials

In the first in-person session participants created an account for themselves on the site runtastic.com. Participants then downloaded the runtastic app to their smartphones, which worked as a pedometer. Participants used the free version of the app. Participants were responsible for using the app to collect data on the amount they walked during that day and uploading it to the Runtastic site on at least 6 days of the week. Two participants reported difficulties in using the app and uploading their data. Both received the REP points.

In the second in-person session the participants completed three self-report questionnaires. The first questionnaire was an abridged version of the Rotter Locus of Control Scale, which included thirteen forced choice questions. The Rotter Locus of Control Scale has

been validated across languages and cultures (Tong & Wang, 2006). The second questionnaire was a forty four item measure of the Big Five personality traits called the Big Five Inventory (BFI; John, Naumann, & Soto, 2008). The third questionnaire was a sixteen item measure of situational motivation called the Situational Motivation Scale (SIMS; Guay, Vallerand, & Blanchard, 2000). The language of the SIMS was adapted to reflect the specific context of the study and walking activity. The Rotter Locus of Control Scale, the BFI, and the SIMS are respectively available in Appendix A, Appendix B, and Appendix C.

In the second session participants were also given a brief set of questions orally to collect feedback on their feelings on the study and any thoughts they had on how it could be improved.

Procedure

In the first session participants were shown a PowerPoint slideshow detailing the expectations of the study, which were also read to them verbally. The information the participants received varied slightly depending on the condition that they were in. The four conditions were “positive fixed,” “positive variable,” “negative fixed,” and “negative variable.”

In the “positive fixed” condition participants were told that they would start out with no money and would be given a set amount of money for each period they completed the walking goal of 10,000 steps on at least 4 days of the week. In the “positive variable” condition participants were told that they would be given a random amount of the total possible reward money for each period they completed the walking goal. In the “negative fixed” condition participants were told that they money in the study belonged to them, but that they would lose a set amount for each period they failed to complete the walking goal. In the “negative variable” condition participants were told that the money in the study belonged to them, but that they

would lose a random amount of the total possible for each period they did not complete the walking goal.

After these instructions, the participants used a computer provided by the researchers to create an account on runtastic.com, and then linked the account to the research's account, enabling us to access the participant's walking data after it was uploaded. Participants then downloaded the free version app of the on their smartphone. They then scheduled a second and final in-person session at least seven days later.

Participants had seven days to collect and upload data on their walking activities through runtastic. Participants would receive REP points for uploading data on at least six of the next seven days. Participants would receive ten dollars for completing the walking goal of reaching at least 10,000 steps on at least 4 of the days during the week. The data were examined by the researchers prior to the second session to determine if the participants had met their goals, and then awarded the REP points and money to participants if they had done so.

Results

Of the twelve participants, three completed the walking goal of 10,000 steps on at least four days of the week. However, two of these participants did not attend the second session, and thus did not receive their payment or complete the personality questionnaires. In total, complete data sets of both walking data and personality data were obtained for eight participants. The data on the participants' walking distance was used for the statistical analyses rather than step count due to two participants specifically missing their step count information on several of the days.

A Pearson product-moment correlation coefficient was used to examine the relationship between distance walked and each of the ten personality factors evaluated (see Table 1). Locus of control was not correlated with distance walked, $r(8) = .06$, $p > .05$. Extraversion was the

personality factor that had the highest correlation (which was negative) with distance walked, though this correlation was not significant, $r(8) = -.60$, $p > .05$. Four other personality factors had large or medium effect sizes, though none of them were statistically significant. External regulation was positively correlated with distance walked, $r(8) = .50$, $p > .05$. Openness was negatively correlated with distance walked, $r(8) = -.43$, $p > .05$. Conscientiousness was negatively correlated with distance walked, $r(8) = -.39$, $p > .05$. Amotivation was positively correlated with distance walked, $r(8) = -.33$, $p > .05$.

The participants' personality scores were also correlated with each other to see if any of the correlations between distance walked and the personality factors could be due instead to a separate personality factor acting upon both of them (see Table 2). Amotivation was also found to be negatively correlated with extraversion, although this was not significant, $r(8) = -.52$, $p > .05$. Agreeableness was found to be positively correlated with extraversion, which was a significant result, $r(8) = .75$, $p < .05$. Agreeableness was significantly negatively correlated with neuroticism, $r(8) = -.78$, $p < .05$.

Due to the small sample size, the effect of the conditions to which the participants were assigned, "positive fixed," "positive variable," "negative fixed," and "negative variable, was not analyzed. The number of participants in each condition varied between one and three people, and was regarded as too limited of a data set. As such, the conditions of the participants will not be addressed further.

Discussion

The intention of this study was to identify the direction and size of the relationships between the examined personality factors and the amount the participants walked, rather than to look at statistical significance. The results of the study did not confirm the hypothesis, as the

participants' locus of control was not found to be correlated with the distance they walked during the study. This study suffered from issues of participant recruitment, mortality, and, to a degree, floor effects. The period during which the participants were studied overlapped with the summer semester finals week. Many participants stated that they found it difficult to make the time to walk more due to their finals. Additionally, nearly all stated that the REP points were more important to them than they money that was available. Studies and implemented programs that operate on a longer timeframe may produce greater performance output.

Despite the limitations of this pilot study, we can still examine the direction and relative size of the correlations and use them to form new hypotheses for future testing. One of the primary questions asked in this study is whether or not monetary incentives could be used to increase walking behavior. Comparative data of how much the participants, or a control group, walk normally were not gathered as part of the pilot study so this cannot be commented on here. However, we nonetheless have a set of data which describes the personality characteristics associated with the amount of walking conducted by individuals who are receiving eternal, financial rewards for their performance.

A question that can be raised here is if individuals in different types of programs, ones that focus on different motivators, such as one that is internally motivated, rather than externally motivated, would display different correlations with the personality factors examined here. For example, in this study introverts walked more than did extroverts, as indicated by the negative relationship between the participants extroversion score and their walking distance. In all, extraversion, external regulation, openness, conscientiousness, and amotivation were the only correlations that had medium or large effect sizes, as stated earlier (extraversion, openness, and conscientiousness had negative correlations with distance walked).

Would these correlations be different under a program that did not emphasize external rewards? Being able to identify personality profiles that perform the best in different program designs would enable future programs to determine which types of exercise promotion programs individuals should be involved in based on their personality dimensions. For example, if further research confirms that being more extraverted is negatively associated with walking performance in externally motivated programs, and that extroverts perform better in programs with an internally motivated program, then individuals could be placed according to the program that fits them best. This has important implications for increasing the effectiveness of exercise promotion plans and programs by enabling individuals to work in a program that best suits them, rather than using a one size fits all approach.

One issue with correlational data is the existence of the third variable problem. Any of the findings here may not be the result of the two variables in question acting directly on each other, but rather the result of a separate variable affecting both of them. Due to the small set of participants here, statistical analyses could not be run to tease apart this issue. However, a Pearson product-moment correlation coefficient was run to evaluate each of the ten personality factors with each other. For example, amotivation was found to be positively associated with distance walked in this study, which was an unexpected result. Amotivation was also found to be negatively correlated with extraversion, but not to a significant degree. As such, it is possible that amotivation varied in conjunction with extraversion, rather than directly with distance walked.

Although locus of control was not found to be correlated with walking performance in this study, several correlated factors were found, including introversion and external motivational style, though they were not statistically significant. A larger sample size would help a great deal in verifying the direction and magnitude of the correlations found here. Future

testing should also be done to identify the personality traits associated with the highest performance in other types of programs designed to increase exercise and healthy behaviors. In doing so, individuals could be placed into program based on their personality characteristics, thus increasing the effectiveness of the program.

References

Barness, L. A., Opitz, J. M., & Gilbert-Barness, E. (2007), Obesity: Genetic, molecular, and environmental aspects. *American Journal of Medical Genetics Part A,* 143A: 3016–3034. doi: 10.1002/ajmg.a.32035

Ingledew, D. K., Markland, D., & Medley, A. R. (1998). Exercise motives and stages of change. *Journal of Health Psychology, 3,* 477-489. doi: 10.1177/135910539800300403

John, O. P., Naumann, L. P., & Soto, C. J. (2008). Paradigm Shift to the Integrative Big-Five Trait Taxonomy: History, Measurement, and Conceptual Issues. In O. P. John, R. W. Robins, & L. A. Pervin (Eds.), *Handbook of personality: Theory and research* (pp. 114-158). New York, NY: Guilford Press.

McFarland, C., & Ross, M. (1982). Impact of causal attributions on affective reactions to stress and failure. *Journal of Personality and Social Psychology, 43*, 937-946. doi: 10.1037/0022-3514.43.5.937

Shields, C. A., Brawley, L. R., & Lindover, T. I. (2005). Where perception and reality differ: dropping out is not the same as failure. *Journal of Behavioral Medicine, 28,* 481-491. doi: 10.1007/s10865-005-9012-9

Sinha, S. P., & Gupta, S. (2006). State self esteem and causal attribution in reattribution training among self worth protective students. *Journal of the Indian Academy of Applied Psychology. 32,* 241-247.

Tong, J., & Wang, L. (2006). Validation of locus of control scale in Chinese organizations. *Personality and Individual Differences. 41*, 941-950. doi: 10.1016/j.paid.2006.03.018.

Table 1. Correlations between personality factors and distance walked

		Distance Walked
Locus Of Control	Pearson Correlation	.063
	Sig. (2-tailed)	.883
	N	8
Extraversion	Pearson Correlation	-.600
	Sig. (2-tailed)	.116
	N	8
Agreeableness	Pearson Correlation	-.189
	Sig. (2-tailed)	.654
	N	8
Conscientiousness	Pearson Correlation	-.388
	Sig. (2-tailed)	.342
	N	8
Neuroticism	Pearson Correlation	-.063
	Sig. (2-tailed)	.881
	N	8
Openness	Pearson Correlation	-.427
	Sig. (2-tailed)	.291
	N	8
Intrinsic Motivation	Pearson Correlation	-.148
	Sig. (2-tailed)	.727
	N	8
Identified Regulation	Pearson Correlation	.137
	Sig. (2-tailed)	.745
	N	8
External Regulation	Pearson Correlation	.503
	Sig. (2-tailed)	.204
	N	8
Amotivation	Pearson Correlation	.329
	Sig. (2-tailed)	.427
	N	8

Table 2. Correlations between personality factors

		Locus Of Control	Extraversion	Agreeableness	Conscient-iousness	Neuroticism	Openness	Intrinsic Motivation	Identified Regulation	External Regulation	Amotivation
Locus Of Control	Pearson Correlation	1	-.210	-.111	-.233	.394	.472	-.400	-.539	-.595	.000
	Sig. (2-tailed)		.617	.794	.579	.334	.238	.326	.168	.120	1.000
	N	8	8	8	8	8	8	8	8	8	8
Extraversion	Pearson Correlation	-.210	1	.754*	.682	-.621	-.173	-.019	.290	-.139	-.524
	Sig. (2-tailed)	.617		.031	.062	.100	.682	.964	.487	.743	.183
	N	8	8	8	8	8	8	8	8	8	8
Agreeableness	Pearson Correlation	-.111	.754*	1	.636	-.779*	-.407	-.521	.083	.321	-.468
	Sig. (2-tailed)	.794	.031		.090	.023	.317	.185	.844	.438	.243
	N	8	8	8	8	8	8	8	8	8	8
Conscientiousness	Pearson Correlation	-.233	.682	.636	1	-.285	-.452	-.383	.233	.055	-.645
	Sig. (2-tailed)	.579	.062	.090		.495	.261	.348	.578	.897	.084
	N	8	8	8	8	8	8	8	8	8	8
Neuroticism	Pearson Correlation	.394	-.621	-.779*	-.285	1	.464	.195	-.203	-.493	.019
	Sig. (2-tailed)	.334	.100	.023	.495		.247	.643	.629	.215	.964
	N	8	8	8	8	8	8	8	8	8	8
Openness	Pearson Correlation	.472	-.173	-.407	-.452	.464	1	.163	-.335	-.505	.023
	Sig. (2-tailed)	.238	.682	.317	.261	.247		.699	.417	.201	.957
	N	8	8	8	8	8	8	8	8	8	8
Intrinsic Motivation	Pearson Correlation	-.400	-.019	-.521	-.383	.195	.163	1	.531	-.230	.106
	Sig. (2-tailed)	.326	.964	.185	.348	.643	.699		.176	.584	.802
	N	8	8	8	8	8	8	8	8	8	8
Identified Regulation	Pearson Correlation	-.539	.290	.083	.233	-.203	-.335	.531	1	.299	-.537
	Sig. (2-tailed)	.168	.487	.844	.578	.629	.417	.176		.471	.170
	N	8	8	8	8	8	8	8	8	8	8
External Regulation	Pearson Correlation	-.595	-.139	.321	.055	-.493	-.505	-.230	.299	1	-.006
	Sig. (2-tailed)	.120	.743	.438	.897	.215	.201	.584	.471		.989
	N	8	8	8	8	8	8	8	8	8	8
Amotivation	Pearson Correlation	.000	-.524	-.468	-.645	.019	.023	.106	-.537	-.006	1
	Sig. (2-tailed)	1.000	.183	.243	.084	.964	.957	.802	.170	.989	
	N	8	8	8	8	8	8	8	8	8	8

*. Correlation is significant at the 0.05 level (2-tailed).

Appendix A.

Locus of Control

For each question select the statement that you agree with the most

1. a. Many of the unhappy things in people's lives are partly due to bad luck.
   b. People's misfortunes result from the mistakes they make.
2. a. One of the major reasons why we have wars is because people don't take enough interest in politics.
   b. There will always be wars, no matter how hard people try to prevent them.
3. a. In the long run people get the respect they deserve in this world
   b. Unfortunately, an individual's worth often passes unrecognized no matter how hard he tries
4. a. The idea that teachers are unfair to students is nonsense.
   b. Most students don't realize the extent to which their grades are influenced by accidental happenings.
5. a. Without the right breaks one cannot be an effective leader.
   b. Capable people who fail to become leaders have not taken advantage of their opportunities.
6. a. No matter how hard you try some people just don't like you.
   b. People who can't get others to like them don't understand how to get along with others.
7. a. I have often found that what is going to happen will happen.
   b. Trusting to fate has never turned out as well for me as making a decision to take a definite course of action.
8. a. In the case of the well prepared student there is rarely if ever such a thing as an unfair test.
   b. Many times exam questions tend to be so unrelated to course work that studying in really useless.
9. a. Becoming a success is a matter of hard work, luck has little or nothing to do with it.
   b. Getting a good job depends mainly on being in the right place at the right time.
10. a. The average citizen can have an influence in government decisions.
    b. This world is run by the few people in power, and there is not much the little guy can do about it.
11. a. When I make plans, I am almost certain that I can make them work.
    b. It is not always wise to plan too far ahead because many things turn out to be a matter of luck anyway.
12. a. In my case, getting what I want has little or nothing to do with luck.
    b. Many times we might just as well decide what to do by flipping a coin.
13. a. What happens to me is my own doing.
    b. Sometimes I feel that I don't have enough control over the direction my life is taking.

Score one point for each of the following:

1. a, 2 . b, 3. b, 4. b, 5. a, 6. a, 7. a, 8. b, 9. b, 10. b, 11. b, 12. b, 13. b,

A high score = External Locus of Control.

A low score = Internal Locus of Control.

Appendix B.

How I am in general

Here are a number of characteristics that may or may not apply to you. For example, do you agree that you are someone who *likes to spend time with others*? Please write a number next to each statement to indicate the extent to which **you agree or disagree with that statement.**

1 Disagree Strongly	**2** Disagree a little	**3** Neither agree nor disagree	**4** Agree a little	**5** Agree strongly

I am someone who…

1. _____ Is talkative
2. _____ Tends to find fault with others
3. _____ Does a thorough job
4. _____ Is depressed, blue
5. _____ Is original, comes up with new ideas
6. _____ Is reserved
7. _____ Is helpful and unselfish with others
8. _____ Can be somewhat careless
9. _____ Is relaxed, handles stress well.
10. _____ Is curious about many different things
11. _____ Is full of energy
12. _____ Starts quarrels with others
13. _____ Is a reliable worker
14. _____ Can be tense
15. _____ Is ingenious, a deep thinker
16. _____ Generates a lot of enthusiasm
17. _____ Has a forgiving nature
18. _____ Tends to be disorganized
19. _____ Worries a lot
20. _____ Has an active imagination
21. _____ Tends to be quiet
22. _____ Is generally trusting
23. _____ Tends to be lazy
24. _____ Is emotionally stable, not easily upset
25. _____ Is inventive
26. _____ Has an assertive personality
27. _____ Can be cold and aloof
28. _____ Perseveres until the task is finished
29. _____ Can be moody
30. _____ Values artistic, aesthetic experiences
31. _____ Is sometimes shy, inhibited
32. _____ Is considerate and kind to almost everyone
33. _____ Does things efficiently
34. _____ Remains calm in tense situations
35. _____ Prefers work that is routine
36. _____ Is outgoing, sociable
37. _____ Is sometimes rude to others
38. _____ Makes plans and follows through with them
39. _____ Gets nervous easily
40. _____ Likes to reflect, play with ideas
41. _____ Has few artistic interests
42. _____ Likes to cooperate with others
43. _____ Is easily distracted
44. _____ Is sophisticated in art, music, or literature

Appendix C.

The Situational Motivation Scale (SIMS)

Directions: Read each item carefully. Using the scale below, please circle the number that best describes the reason why you are currently engaged in this activity. Answer each item according to the following scale:

1 Corresponds not at all	**2** Corresponds a very little	**3** Corresponds a little	**4** Corresponds moderately	**5** Corresponds enough	**6** Corresponds a lot	**7** Corresponds exactly

---

Why did you walk as much as you did during the past week?

1. Because I think that this activity is interesting	1	2	3	4	5	6	7
2. Because I am doing it for my own good	1	2	3	4	5	6	7
3. Because I am supposed to do it	1	2	3	4	5	6	7
4. There may be good reasons to do this activity, but personally I don't see any	1	2	3	4	5	6	7
5. Because I think that this activity is pleasant	1	2	3	4	5	6	7
6. Because I think that this activity is good for me	1	2	3	4	5	6	7
7. Because it is something that I have to do	1	2	3	4	5	6	7
8. I do this activity but I am not sure if it is worth it	1	2	3	4	5	6	7
9. Because this activity is fun	1	2	3	4	5	6	7
10. By personal decision	1	2	3	4	5	6	7
11. Because I don't have any choice	1	2	3	4	5	6	7
12. I don't know; I don't see what this activity brings me	1	2	3	4	5	6	7
13. Because I feel good when doing this activity	1	2	3	4	5	6	7
14. Because I believe that this activity is important for me	1	2	3	4	5	6	7
15. Because I feel that I have to do it	1	2	3	4	5	6	7
16. I do this activity, but I am not sure it is a good thing to pursue it	1	2	3	4	5	6	7